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AUTHOR Porter, Kathleen
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ABSTRACT

Presented are analyses of data gathered from the evaluation of the National Science Foundation's Comprehensive Assistance to Undergraduate Science Education (CAUSE) program projects funded between 1976 and 1978. Broad focus techniques were used, which include both a survey of 201 CAUSE project directors and the content analysis of 273 funded CAUSE proposals. The content analysis of CAUSE proposals provides an overview of the way projects were described before they were implemented; the survey of CAUSE directors portrays the projects as seen by project directors either during implementation or after project completion. Numerous tables list directors' responses to individual items on the survey questionnaire. (CS)

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BROAD VIEW OF CAUSE PROJECTS: SURVEY OF PROJECT DIRECTORS AND ANALYSES OF PROPOSALS

Kathleen Porter

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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BROAD VIEW OF CAUSE PROJECTS

Introduction

Kathleen Porter

The CAUSE Program is four years old. A program evaluation has been conducted by Development & Evaluation Associates with the aim of refining and improving the CAUSE program. This evaluation provides a description and analysis of the CAUSE program. The specific issues of the evaluation are: (1) the extent to which high priority local college and university needs are being met by local CAUSE projects; (2) the ways in which CAUSE projects are being implemented; (3) the extent to which instructional improvement is resulting from CAUSE; (4) the nature and use of evaluation data on CAUSE projects; (5) the relative costs of the functional activities of CAUSE projects and how they relate to post-CAUSE institutional support; and (6) program changes and modifications to be made in the CAUSE program.

This paper contains analyses of data gathered using the broad focus techniques of the evaluation. In contrast to the narrow in-depth focus provided by the eight case studies of CAUSE projects and the somewhat broader focus provided by the 17 site visits, the activities described in this paper - the analysis of 273 funded CAUSE proposals, and the surveying of 201 CAUSE project directors - provide a broad view of all the CAUSE projects funded between 1976 and 1978.

The data gathered from the CAUSE proposals and from the survey of project directors have been aggregated for the purpose of discovering trends. As with most quantitative methods, these were utilized for the purpose of justifying broad statements about CAUSE projects. In contrast,

the qualitative methods used in the site visits and the case studies were sensitive to peculiarities and individual differences.

The broad focus evaluation relied upon a quantitative content analysis of CAUSE proposals and the use of programs in SPSS (Statistical Packages for the Social Sciences) for analysis of the survey of project directors. In contrast, the narrow and medium focus evaluations relied upon observation.

The content analysis of CAUSE proposals provides an overview of the way projects were described before they were implemented. It portrays the intended recipients of the benefits of the proposed projects; it describes the needs as they were perceived by the proposers; it displays the goals and objectives of the proposed projects; it portrays the proposed strategies for meeting needs and realizing goals.

The survey of CAUSE project directors, on the other hand, portrays the projects as seen by project directors either during implementation or after project completion. It displays the amount and kinds of modifications made in the projects since the proposal was written; it portrays those activities project directors describe as important for assuring success; it displays those factors which project directors describe as having been a problem for their projects; it describes project directors' attitudes toward project evaluation and recommendations they would make to NSF and to prospective project directors.

Taken together, the two broad focus techniques provide a before and after snapshot of the CAUSE program as a whole.

SURVEY OF CAUSE PROJECT DIRECTORS, 1976-1978

Summary

This section describes the findings from the Survey of Project Directors. It begins by describing the purposes of the survey, its place in the overall evaluation of the CAUSE program, the development of the two versions of the survey, and the procedures used in obtaining and analyzing the survey data.

Next, general findings are summarized within five of the six issues identified as those informing the evaluation as a whole: institutional need, project implementation, instructional improvement, evaluation, and recommendations for modifications.

Specific findings are compared between those questions which are common, or at least similar, to the two versions of the survey. Tables follow which present those comparisons in terms of percentage of project directors from each of the two samples who chose each option to each question.

At the end of the section are tables summarizing project directors' responses, first to Survey One and then to Survey Two. These tables present the percentage of project directors who chose each option to each item to both forced-choice and open-ended questions.

Development and Procedures of the Survey

This survey represents one of the broad focus data collection techniques of the evaluation of the National Science Foundation's Comprehensive Assistance to Undergraduate Science Education (CAUSE) program. The broad focus evaluation techniques, which include both the survey and the content analysis of funded proposals, provide an overview of the total CAUSE program in contrast to the site visits which provide a medium range view and the case studies which provide a close-up portrayal of some sample projects.

The survey provides reliable information on program-wide issues by aggregating the responses of virtually all the project directors on critical aspects of their projects like project implementation, impact, evaluation, and overall project success in the case of the first random sample of project directors, and project characteristics, implementation, impact, evaluation, and recommendations in the case of the second random sample of project directors.

Purpose

The function of the survey is to extend and broaden the primary data bases to include the critical insights of project directors. No other CAUSE staff participated. It is our belief that project directors have a unique perspective and can provide important information about the functioning of CAUSE projects at the local level. The purposes of the survey are to identify the diversity of views held by project directors on the critical evaluation issues and to confirm or disconfirm observations

made during the 17 site visits and over the course of the eight case studies.

The specific goal of the survey is to focus on CAUSE projects in the way in which they evolve. The topics covered by the survey include how CAUSE projects get implemented, what kind of impact projects have on institutions, how decisions are made as the project progresses, and how successful projects are. These issues have been found to be important to the success of instructional improvement projects according to literature on instructional development in higher education (e.g., Diamond et al., 1975; Durzo, 1976; Holsclow, 1974).

Surveys, in general, have some very definite strengths and weaknesses. The major advantage is the ability to gather data from a representative sample by methods which are more efficient than those of direct interactions with or observation of project staff. In the case of this evaluation the representativeness of the sample is assured since the two-stage survey process surveys all funded CAUSE projects, 1976-78. Bias in sampling is one limitation of surveys which this evaluation avoids. However, another limitation of surveys--that is, the superficial level to which issues may be studied--is important to consider. By using surveying as only one method in a multiple method evaluation this study has built into it opportunities to study all issues in depth with a small number of cases. The weakness of the survey is overcome by utilization of other methods which permit more in-depth analysis.

Method of the Survey

Instrument development. The survey was developed and implemented in two stages in order to increase the validity and utility of the data and to provide an opportunity to refine the issues of the evaluation as they

evolved. We sent the first survey to 50% of the project directors in the spring of 1979. At the same time some site visits and the content analyses of project proposals were conducted. The initial findings from these methods were analyzed together with the responses from the first version of the survey. All results were used to revise the survey which we sent to the remaining 50% of CAUSE project directors in the winter of 1979-80. Surveying two different samples in two stages with an initial and a revised version greatly increased the power of the resulting data.

Issue selection. The first survey was organized in accordance with the specific evaluation issues that we had identified as important. These were: 1) the extent to which high priority local college and university needs are being met by local CAUSE projects; 2) the ways in which CAUSE projects are being implemented; 3) the extent to which instructional improvement is resulting from CAUSE; 4) the nature and use of evaluation data on CAUSE projects; 5) program changes and modifications to be made in the CAUSE program. The sixth issue, the relative costs of the functional activities of CAUSE projects, we thought would not lend itself well to careful investigation in a survey. The cost analysis issue involves complex questions which must be tailored to the specific project being studied.

Based on issues which emerged from the first survey, we framed a series of questions which were to be explored in the second version of the survey. Having framed the questions, we constructed items which we hoped would meaningfully elicit responses.

The questions we believed merited exploration in the second survey are as follows:

-Are project directors and institutions with experience in writing proposals and managing externally-funded projects more likely to write successful proposals and manage successful projects than their colleagues without previous experience?

-Do project directors belong to a communications network through which they heard about CAUSE?

-Is it the case that most successful proposals were submitted and re-submitted?

-Are organizational issues (e.g., obtaining the commitment and cooperation of administrators) important to project success?

-Is there a general confusion about what NSF means by evaluation?

-Has there been general difficulty in the articulation between proposal and implementation especially in the areas of the management plan and the timetable?

-Are the most important outcomes in the areas of improved faculty and/or institutional relations, student competency and improved student attitudes?

-Are incentives provided by the institution to CAUSE project staff important to project success?

These questions could be answered only in terms of project directors' perceptions about what contributes to project success or what the most important outcomes might be.

Administration. Local CAUSE projects are extremely diverse in terms of several variables: duration of project (12, 24, or 36 months); type of institution (two-year college, baccalaureate granting college, Ph.D. granting university or a consortium); amount of NSF funding (up to $300,000); and academic discipline focus (natural, physical, social sciences or multi-disciplinary).

We believed, therefore, that it was necessary to survey the total population of project directors for three years - 1976, 1977 and 1978 (n-201). Of these, 50% were randomly selected to participate in the first version of the survey, and 50% in the revised version.

In addition to our evaluation staff, outside consultants reviewed and critiqued both versions of the Survey of CAUSE Project Directors. The consultants represent a wide range of expertise in the following areas: science education research, instructional development and program evaluation in higher education, tests and measures development, instructional improvement projects in science, attitude scaling, technical writing, and CAUSE projects. Many helpful suggestions from the consultants were incorporated into the final version of both surveys. Several questions were dropped based on their suggestions; others were reformated or reworded.

The first version of the survey was mailed out in the spring of 1979. Eighty-nine project directors completed it.

The processes of refining the issues to be addressed in the survey and of revising the survey took place in the summer of 1979. We sent the revised survey to the second sample of project directors in the winter of 1979-80. Ninety-five project directors completed the second survey.

Data analysis. Data from the first version of the survey were coded case by case from the survey forms and put on punched cards in order to create a computer disk data file. Initial analyses included frequency, range, and variance of responses on a question by question basis. Cross tabulations of responses by question with the key CAUSE variables of length of project, type of institution, amount of funding, and academic discipline focus were made. Free responses and responses to open-ended questions were analyzed through a qualitative data reduction procedure involving the categorizing, sorting and summarizing of responses.

Data we had collected from other parts of the ongoing evaluation were combined and analyzed together with the results of the first version of

the survey. These data formed the basis for determining issues to be examined in the second version of the survey.

Data from the second survey were coded and analyzed in the same manner as the first version.

Summary of Findings

The results of the two surveys, taken together, are reported here for those questions which are common to both surveys or are similar enough to be discussed together. Table 1 portrays the percentage of project directors from each sample who chose each alternative to each question that was common to both surveys. The questions do not appear in full but have been shortened to statements which portray the topic of each. For a full portrayal of the percentages responding to each option, please see the tables.

In many ways the two surveys are not, strictly speaking, comparable. Some questions from the first survey were dropped for the second; some questions were added to the second survey that were not present on the first. Moreover, the first survey was meant to elicit issues and concerns from project directors which could then be investigated more fully in the second survey. However there are some questions and issues which remain the same in both surveys in order to establish response reliability. The discussion which follows is organized according to the major issues.

Institutional Need

There are a number of potential indicators of institutional need. One is whether CAUSE-related activities were initiated under other funding before the CAUSE grant was obtained and whether CAUSE activities will continue when CAUSE funding ceases. Another indicator is the level of commitment from administrators and other campus policy makers.

It may, of course, be argued that CAUSE activities can receive institutional support without necessarily reflecting institutional need:

a minority of faculty or administrators may have a need which is not general for the institution. They may write a proposal and receive funding. It is unlikely, however, that the institution would continue CAUSE activities after NSF funding ended or that the majority of institutional policy makers would become committed to the CAUSE project unless there existed a general perception that CAUSE activities satisfied widespread institutional needs. Further, it is likely that an institutional history of support for CAUSE-related activities which pre-dates the CAUSE grant itself is strongly suggestive of institutional need.

We asked the second sample of project directors whether activities on the CAUSE project were begun before NSF funding was obtained. Fifty-four percent indicated that, indeed, CAUSE activities were begun before NSF funding was obtained. This is a substantial percentage and indicates that institutions were initiating activities meant to be responsive to real needs and applied for CAUSE monies to help support these activities when the institutions could not bear the financial burden alone. That NSF funds were needed is indicated by the percentage of first sample project directors (46%) who reported that without CAUSE funds they would have given up their projects.

We also asked the second sample of project directors whether they had sought or would seek additional funding when CAUSE monies ran out. Seventy percent of project directors said they would seek additional funding. Of those who said they had not or would not, virtually all of them reported that their institution would support the continuation of CAUSE activities. Strong institutional support is suggested by the fact that all project directors in the second sample believe that support will

be found for the continuation of CAUSE activities except in cases where CAUSE supported "one time only" purchases like facilities construction or equipment purchase.

The commitment and cooperation of institutional policy makers seems a bit more problematical. Virtually all project directors agreed that it was an important part of the job of project director to promote good communication and good relations throughout the campus. The importance of gaining cooperation from all relevant groups on campus was stressed over and over again in different contexts. In the open-ended questions project directors cited administrative commitment and faculty acceptance as crucial to project success. They also cited these same factors as difficult to obtain. In the forced-choice questions communication problems within the institution and the reluctance of important department and school administrators to commit themselves were cited as two of the leading difficulties by both samples. Clearly, gaining the cooperation of interest groups on campus is related to the project director's role as an opinion leader and opinion maker. It is possible that project directors who cited gaining institution-wide cooperation as an issue for them originally believed rather naively that running a CAUSE project meant simply supervising implementation activities.

This would be in keeping with the finding that the vast majority of project directors agreed that "our project has cooperation from our institution's administrators at all levels" and that, "in general, our project has received cooperation from our entire academic community".

If this argument is correct, then it is probably the case that institutional policy makers generally support the CAUSE project on their campus and that the project meets some institutional needs.

Implementation

We asked project directors to describe how their projects were being implemented by asking them to respond in three areas: changes they had made from originally proposed activities; activities they believed were important to project success; difficulties they had encountered during the implementation process.

Issues concerning time and deadlines were mentioned in connection with all three areas. Timelines were most frequently mentioned as components of the project that had changed from what was described in the proposal. Delays in receiving materials and receiving approval from NSF were two of the most frequently cited difficulties. Careful planning and timely implementation were mentioned by a large majority as important to success. There has been a great deal of frustration over the inability of project staffs to meet deadlines they had set. Some contributing factors might have been: naivete of the proposal writers about how long project activities will take; NSF's schedule of approval of CAUSE proposals which is not consistent with some institutions' planning schedules; changes in project staff or in the management plan at the institutional level.

It does seem to be the case that an important element of project success is a compatible and committed project staff and that a serious difficulty, when it happens, is loss of staff or changes in staff.

Project directors noted the importance of choosing project staff carefully. They also expressed frustration over the conflicting commitments of project staff. It was felt by several project directors that staff necessarily pursue teaching, service, and scholarship activities because those are the activities which the institution is willing to reward. As a result, work on CAUSE has been an add-on. A related issue is the

perception of several project directors that they have not gotten maximum productivity from their project staff.

Perhaps as important to project directors as commitment is good staff relations. Over 80% of both samples reported that working collaboratively with project staff is important to success.

A related issue, mentioned spontaneously in open-ended questions, is the role of the project director. Many project directors mentioned the enormous time and energy involved in performing the job. Apparently it is more demanding a role than many expected. The necessity of commitment and dedication was underscored.

The need for good management skills was also mentioned. The responsibilities involved in meeting deadlines, allocating responsibilities to other staff members and being the primary communication link to other parts of the institution seem to some project directors a great deal heavier than they had bargained for.

Project directors also mentioned their need for information about other projects at other institutions. Many believed that seeing other instructional improvement projects in operation could give them valuable assistance in achieving their goals and avoiding possible pitfalls.

Instructional Improvement

In both samples there are indications that project directors believe that instructional improvement has taken place. Clearly this is the most important outcome of any CAUSE project. Ultimately, any improvements brought about by CAUSE monies should benefit the student.

If the argument is credible that improving faculty guarantees instructional improvement, then two facets or components of instructional improvement are affected: student outcomes and faculty outcomes.

Although none of the questions about project impact are the same from Survey One to Survey Two, there are a few which try to elicit similar information. In fact, the questions on Survey Two are an attempt to place an increased emphasis on impact issues in light of findings from Survey One. While on Survey One, we asked two forced-choice questions, one on perceived changes in student academic performance and the other on perceived changes in the quality of instruction by faculty members, we asked four open-ended questions on Survey Two: what changes in students were expected? what changes were observed? what changes in faculty were expected? what changes were observed? Thus, the kinds of responses that could be given were considerably widened in Survey Two.

Almost 90% of Sample One project directors reported great positive change or some positive change in quality of student academic preparation. Thirty percent of Sample Two project directors spontaneously reported having observed improved student performance and competency as a result of CAUSE. Between one fifth and one quarter of project directors in both samples also reported, primarily in the open-ended questions, improved student attitudes toward science and greater student participation in decisions and activities affecting their education.

Finally, a substantial number of comments cropped up from both samples expressing enthusiasm over additional opportunities created for students. Whether the comments were in connection with questions about improved faculty performance, new or revised curricula, new facilities, equipment, or computer capabilities, or new instructional strategies, they all said the same thing: the CAUSE project has created new options and new services that can enrich the experience of the student enrolled in CAUSE-related science courses.

Project directors expressed a belief that students are benefiting from CAUSE activities in a variety of ways, some of them related to improved feelings of self-confidence and mastery when confronted with science materials.

Survey One asked project directors to rate the level of improvement in quality of instruction for CAUSE faculty members, for non-CAUSE faculty members in departments formally involved in the project and by non-CAUSE faculty in departments not formally involved with the project. Sample One project directors reported that 85% of CAUSE faculty have experienced some positive change or great positive change; 42% of non-CAUSE faculty in CAUSE departments have; and only 7% of non-CAUSE faculty in non-CAUSE departments have experienced positive change. Sample Two project directors did not make those distinctions but spontaneously reported that the leading change in faculty is that teaching effectiveness has been enhanced and faculty have a better relationship with students (22%); and the second most frequently cited change is that faculty capabilities have been broadened and increased and faculty are engaging in new activities (21%).

In this connection, it is also interesting to note that Sample One project directors reported in Question Nineteen that the most important success of their project was the growth of faculty awareness and improved attitudes and skills (28%).

It would seem, then, that whatever project directors describe their projects to be primarily about, an important outcome is faculty development. Faculty are learning how to write grant proposals, how to use the computer, how to do curriculum development and how to use new teaching strategies as a result of the CAUSE project at their institution. Project directors, reporting this in the open-ended questions in both surveys, sounded

surprised and pleased by this.

Several project directors from both samples also reported, with some surprise, that faculty at their institution and particularly in departments directly affected by CAUSE were working more collaboratively than expected. Many CAUSE projects encourage the development of an esprit de corps that was not present before CAUSE.

There is also the sense that faculty morale has improved as a result of learning new skills and/or being exposed to new domains of knowledge.

Evaluation

The first sample of project directors was asked many more questions about evaluation than the second. In the first survey we asked project directors to report on the present state of their evaluation activities; what aspects of the project were being evaluated; what types of data were being collected; and who participated in decisions affecting project evaluation. We also presented a list of statements about evaluation and asked project directors to agree or disagree with them. In the second survey, there was only one item covering project evaluation: a list of statements (different from the one in Survey One) with which project directors were asked to agree or disagree.

Because of the differences in the questions between the two surveys, it is difficult to compare Sample One with Sample Two on the issue of evaluation. There is, however, detectable in both surveys, an unease about the issue. Both samples reported that the evaluation plans described in the proposal are not an accurate reflection of evaluation as it occurs. Project directors in both samples agree with statements which suggest that evaluation is valuable. Ninety-three percent of project directors in Sample One agree with this statement from Question Seventeen: "It is

important that CAUSE guidelines require evaluation as part of projects." Eighty-six percent of project directors agree with this statement: "Evaluation plays a more prominent role in our project than it does elsewhere in our institution's science programs." Sample Two project directors agree in high numbers with statements like the following: "Evaluation is important to the institution in monitoring the effectiveness of projects of this type" (93%); "Evaluation results have been used to change some of the activities and/or outcomes of this project" (68%).

At the same time, a substantial minority in both samples indicated an impatience with evaluation activities as being wasteful of resources. Twenty-five percent of Sample One project directors agree that the evaluation of their CAUSE project probably requires more time and effort than it is worth; and 21% agree that formal evaluation activities take too much time and effort for their project. A large minority of Sample Two project directors agree. Twenty-seven percent agree that formal evaluation activities take up too much time, effort, and money on their CAUSE project; and 27% agree that project funds allocated for evaluation activities could be better spent on other project activities.

There seems to be some division of feeling about evaluation in both samples. It may simply be that project directors approve of evaluation in principle and believe in its potential usefulness, but do not want to expend project resources on evaluation activities that they believe might be better used for implementation. A large minority of both samples reported that evaluation has not gone as planned, and both samples reported that they perceive evaluation as important to project success. Evaluation seems to be both a source of frustration and a vehicle for achieving desired outcomes.

Recommendations

Several questions on both surveys asked project directors if they had any recommendations to make to NSF. By far the most frequently recurring recommendation is for more information sharing. Several forums for information exchange were suggested by project directors: NSF should hold meetings, edit a newsletter or find some other means of disseminating information about various aspects of running a CAUSE project; there should be sharing of information among project directors in which mutual help is offered. More experienced project directors might offer a "lessons learned" workshop or publication.

Many project directors stated that they feel isolated. They also tend to learn the hard way how to manage a CAUSE project. There is a widespread belief that each project director should not be required to re-invent the wheel.

It is important to mention that many project directors praised NSF suggesting that NSF had always been both helpful and flexible. Comments praising NSF's cooperativeness appeared not only in response to a question soliciting recommendations to NSF in Survey Two, but appeared spontaneously in margins and at the end of the survey where extra comments were invited.

Sample Two project directors also were asked to make recommendations to prospective project directors in the areas of strategies for ensuring project success and for evaluation of project activities. These may be considered a list of lessons project directors have learned from their experience on CAUSE projects.

The three most commonly mentioned strategies for ensuring project success are: (1) making sure management and authority issues are worked

out within the project staff; that is, being clear and definite about who does what, when, and who reports to whom; knowing who is doing what for the sake of effective monitoring; (2) doing careful front-end planning; trying to foresee what problems might arise and being prepared with contingency plans; and (3) getting the commitment of the faculty to the project; making sure there is widespread support for project activities.

The three most commonly mentioned recommendations concerning project evaluation are the following: (1) using outside experts to do the evaluation; these may be from outside the institution, but should at least be from outside affected departments; (2) being realistic about evaluation; not trying to accomplish more than is reasonable; finding an evaluation plan that the project director can live with and be satisfied with; and (3) doing a formative evaluation in which modifications are made as the project evolves in light of information that has been gathered.

These, then, constitute the general findings of the two surveys taken together. The following pages provide a detailed discussion of the findings from each question from each version of the survey.

Table 1

Comparison of Responses to Questions
Which Appeared on Both Survey One (S_1) and Survey Two (S_2)
Percentages of Response

Question 2a. (S_1)
Question 12a. (S_2)

Accuracy[a] of the original description in the proposal for each of the following project components.

	Accurate		Inaccurate		No Response	
	S_1	S_2	S_1	S_2	S_1	S_2
Project objectives and goals	99%	99	1	1	0	0
Project management	97	97	3	2	0	1
Timetables or time-lines	79	67	20	33	1	0
Evaluation plans	87	82	12	17	1	1
Impact of project	87	88	8	6	5	5

Question 5a. (S_1)
Question 13a. (S_2)

Importance[b] of some activities to project success.

	Important		Unimportant		Doesn't Apply or No Response	
	S_1	S_2	S_1	S_2	S_1	S_2
Project planning and management sessions	84%	82	16	14	0	2
Efforts to win support for our project at our institution	69	78	20	18	11	4
Working with faculty members on the project staff	94	83	2	13	3	4
Working with students on the project	66	70	27	22	7	8
Advising students	48	32	25	40	27	28
Writing reports and related administrative paperwork	46	39	51	59	3	2

	Important		Unimportant		Doesn't Apply or No Response	
	S_1	S_2	S_1	S_2	S_1	S_2
Ordering supplies and equipment	78	74	21	23	1	3
Evaluating the project	90	83	9	16	1	1
Designing instructional materials	92	88	4	5	3	6
Designing facilities and selecting equipment	89	84	6	9	6	8
Describing the project to others	69	69	28	28	3	2
Developing a new curriculum	61	58	20	24	19	18
Seeking financial support for the project once NSF funds are gone	63	60	30	28	6	12
Teaching related to our project	96	92	3	4	1	4
Working with lab technicians	38	56	30	21	31	25

Question 4a. (S_1)

Question 15a. (S_2)

Seriousness[c] of various difficulties which may arise on a CAUSE project.

	Serious		Not Serious		Don't Know or No Response		Doesn't Apply[d]
	S_1	S_2	S_1	S_2	S_1	S_2	S_2
Delay of formal approval of our project by NSF	8%	13	83	68	8	2	17
Confusion of responsibilities within our project	4	3	93	84	2	0	12
Insufficient attention given to project planning	5	2	91	76	3	3	19
Unclear decision making policies on our project	3	2	93	79	3	2	17
Lack of necessary technical assistance (i.e. lab assistance, materials production, A-V equipment, etc.)	7	12	89	67	4	2	19
Short supply or delay of materials	15	14	83	74	2	0	12

	Serious		Not Serious		Don't Know or No Response		Doesn't Apply
	S_1	S_2	S_1	S_2	S_1	S_2	S_2
Communication problems within our institution	11	14	87	76	2	3	7
Misunderstanding of project objectives by project personnel	2	5	96	82	2	2	11
Reluctance of important department or school administrators to commit themselves to our project	9	16	87	75	4	2	7
Lack of attention given to problems of implementation by project personnel	3	11	85	78	4	2	10
Conflicts among project personnel	6	3	91	80	3	2	15
Difficulties with our institution's rules and regulations	3	13	93	74	2	2	12
Difficulties with NSF's rules and regulations	0	0	98	81	2	2	11

S_1, N=89; S_2, N=95.

Note: Complete results for these questions appear in Tables 2 & 3.

[a]"Accurate" represents the total percentage of project directors who chose the options, generally accurate or very accurate in the original question.

"Inaccurate" represents the total percentage of project directors who chose the options, generally inaccurate or very inaccurate.

[b]"Important" represents the total percentage of project directors who chose the options, extremely important or important.

"Unimportant" represents the total percentage of project directors who chose the options, somewhat unimportant or totally unimportant.

[c]"Serious" represents the total percentage of project directors who chose the options, critically serious or serious.

"Not Serious" represents the total percentage of project directors who chose the options, somewhat serious and not serious at all.

[d]This category was used only in Survey Two.

Table 2

Survey of CAUSE Project Directors
Percentages of Response
Spring, 1979
N = 89

1. Extent to which project is meeting or will meet its original goals as stated in the proposal.

Completely Achieved	Partially Achieved	Only Slightly Achieved	Not Achieved At All	No Response
57%	40	1	0	1

2a. Accuracy of the original description in the proposal for each of the following project components.

	Very Accurate	Generally Accurate	Generally Inaccurate	Very Inaccurate	No Response
Project objectives and goals	62%	36	1	0	0
Project management	41	54	2	1	0
Timetables or timelines	6	71	17	3	1
Budget	20	73	4	1	0
Evaluation plans	15	70	12	1	0
Impact of project	33	53	6	1	5

Note: Percentages may not add up to 100% due to rounding error or because project directors were free to give more than one response. Questions which appear in italic type had open-ended responses which were then categorized. For these questions percentages are shown for both the total number of survey respondents and the number of respondents to the question.

2b. *How has your project been modified during its operation to incorporate new findings and/or experience gained?*

% of Total	% of Respondents	
24	25	Proposed activities/management plan
19	21	Construction/equipment
18	19	No changes
17	18	Schedule/timetable
10	11	Budget
9	10	Project staff
6	6	Different courses
6	6	Evaluation
4	5	Goals/objectives
4	5	Materials acquisition
1	1	Reward structures for participation

3. Cooperation received from the institution's administration and faculty members.

	Strongly Agree	Agree	Disagree	Strongly Disagree	Doesn't Apply or No Response
Our project has co-operation from our institution's administrators at all levels	60%	31	4	2	2
Our project has co-operation from all faculty members who are part of the CAUSE project staff	69	30	0	0	1
Our project has co-operation from all non-CAUSE faculty members who are in CAUSE project department(s)	25	45	15	1	14
Our project has co-operation from all non-CAUSE science faculty members in non-CAUSE departments	16	35	10	0	39
In general, our project has received cooperation from our entire academic community	33	47	7	2	11

4a. Seriousness of various difficulties which may arise on a CAUSE project.

	Critically Serious	Serious	Somewhat Serious	Not At All Serious	Doesn't Apply or No Response
Delay of formal approval of our project by NSF	1%	7	18	65	8
Confusion of responsibilities within our project	1	3	12	81	2
Insufficient attention given to project planning	2	3	18	73	3
Unclear decision making policies on our project	2	1	12	81	3
Lack of necessary technical assistance (i.e., lab assistance, materials production, A-V equipment, etc.)	2	4	16	73	4
Short supply or delay of materials	1	13	34	49	2
Communication problems within our institution	2	9	26	61	2
Misunderstanding of project objectives by project personnel	1	1	18	78	2
Reluctance of important department or school administrators to commit themselves to our project	3	6	20	66	4
Lack of attention given to problems of implementation by project personnel	0	3	29	63	4
Conflicts among project personnel	1	4	12	79	3
Difficulties with our institution's rules and regulations	3	1	22	71	2
Difficulties with NSF's rules and regulations	0	0	3	94	2

4b. *Are there other difficulties you have encountered in project implementation which we have not described above?*

% of Total	% of Respondents	
19	27	No, nothing serious
12	18	Timetable could not be adhered to
11	16	Too little support from institution
9	13	Changes in program from proposal
7	10	Institutional budget inadequate for full implementation
4	6	Loss/changes in staff
3	5	Problems in promoting program to students
3	5	Project staff had too little time/energy
2	3	Too much responsibility of director
2	3	Problems with non-NSF state/federal agencies
2	3	Poor communication with NSF
2	3	Difficulty in management of project
2	3	Evaluation

5a. Importance of some activities to project success.

	Extremely Important	Important	Somewhat Unimportant	Totally Unimportant	Doesn't Apply or No Response
Project planning and management sessions	45%	39	16	0	0
Efforts to win support for our project at our institution	35	34	13	7	11
Working with faculty members on the project staff	53	42	2	0	3
Working with students on the project	27	39	25	2	7
Advising students	17	31	19	6	27
Writing reports and related administrative paperwork	3	43	44	7	3

	Extremely Important	Important	Somewhat Unimportant	Totally Unimportant	Doesn't Apply or No Response
Ordering supplies and equipment	39%	38	19	2	1
Evaluating the project	27	63	9	0	1
Designing instructional materials	61	31	4	0	3
Designing facilities and selecting equipment	58	30	6	0	6
Describing the project to others	17	52	28	0	3
Developing a new curriculum	36	25	15	4	20
Seeking financial support for the project once NSF funds are gone	26	37	22	8	6
Teaching (related to our project)	58	37	3	0	1
Working with lab technicians	18	20	21	9	31

5b. *Are there other activities not identified above that are important to project success?*

% of Total	% of Respondents	
6	15	Dedication/commitment of all involved
3	9	Institutional/community support
3	9	Good planning/goal setting
3	9	Getting extra funding or finding ways to make do with present level
2	6	Good job of hiring staff
2	6	Interpersonal dynamics
2	6	Mechanics of producing materials/student use of materials
2	6	Evaluation
1	3	Reviewing instructional materials

6. Percentages of students served by CAUSE projects who are science majors or non-science majors.

% of students	Science Majors # of projects	Science Majors % of projects	Non-science Majors # of projects	Non-science Majors % of projects
0	31	35	40	45
1-9	6	7	10	11
10-19	4	5	5	6
20-29	9	10	8	9
30-39	4	5	2	2
40-49	3	3	4	5
50-59	2	2	4	5
60-69	1	1	1	1
70-79	4	5	3	3
80-89	6	7	3	3
90-99	9	10	5	6
100	10	11	4	5
Total	89	101	89	101

7. Extent of involvement of different groups in CAUSE projects.

	Extensive Involvement	Some Involvement	Minor Involvement	No Involvement	No Response
Institution administrators	7%	38	46	8	1
Department heads	25	39	27	8	1
Faculty members on the CAUSE project staff	93	7	0	0	0
Faculty members in CAUSE department(s)	38	40	17	3	1
Faculty members in non-CAUSE departments	1	15	45	38	1
Students	44	36	13	3	3
Evaluation experts	17	51	24	9	0
Media specialists	13	19	24	43	1
Lab technicians	22	16	16	45	1
NSF staff	1	15	52	33	0

8. Funding alternatives which might have been taken if CAUSE funds had not been available.

13%	Sought other federal funding
2	Sought state funding
9	Sought private funding
3	Sought additional resources elsewhere within our institution
3	Undertaken the project on department(s)'s existing budget
46	Given up on the project for lack of funds
23	Other

9. Direction of changes which might be related to CAUSE project activities.

	Great Positive Change	Some Positive Change	No Change	Some Negative Change	Great Negative Change	No Response
Quality of academic preparation of students attributable to our CAUSE project	24%	63	2	1	0	9
Quality of instruction by CAUSE faculty members	19	66	6	0	0	9
Quality of instruction by non-CAUSE faculty members in departments formally involved with our project	7	35	37	0	0	19
Quality of instruction by non-CAUSE faculty members in departments not formally involved with our project	0	7	71	0	0	23

10. Innovativeness of CAUSE projects as compared to:

	Very Innovative	Somewhat Innovative	Not Innovative	Not Sure	No Response
Regular activities of the department(s) involved in CAUSE	52%	42	2	5	0
Other science departments	43	38	3	5	11
Science departments nationally	24	48	6	21	1

10b. *Please identify briefly the most innovative aspect of your project.*

% of Total	% of Respondents	
34	35	Unique courses or aspects of courses
19	20	Computer use
11	12	Bringing together faculty to work together/ freeing up faculty for students
10	11	Involvement of students in aspects of the project
9	9	Individualized instruction
8	8	Changes in majors and/or sequences of courses
6	6	Evaluation of program
2	2	Equipment and laboratories
2	2	Use of institutional personnel other than faculty
1	1	Relationship with outside agencies
1	1	Introduction of media center

11a. Have science projects (either CAUSE or non-CAUSE) similar to yours at other institutions been a useful source of information and ideas?

57% Yes 30 No 12 Don't know

11b. *If they have been, how did you learn about them?*

% of Total	% of Respondents	
27	42	Journals, meetings, books, directories
18	29	Word of mouth/personal contacts
18	29	CAUSE directors' meeting in Washington, D.C. and/or other NSF meetings
11	18	Visits to other campuses and/or correspondence
7	11	Copies of CAUSE proposals
2	4	CONDUIT
1	2	Chautauqua short courses
1	2	Consultants
1	2	Staff members, ex-NSF readers

11c. *If they have not been, why were they not useful?*

% of Total	% of Respondents	
18	67	Haven't identified any programs sufficiently similar
9	33	Knowledge of other programs has not been needed and/or made available

12a. Current status of project evaluation activities.

2%	We have not yet begun to consider evaluation activities.
7	We have begun evaluation planning but have made little progress.
18	We have begun evaluation planning and have made modest progress.
1	Evaluation planning is nearly complete.
0	Evaluation planning is complete.
71	Evaluation activities are going on now on our project.
1	Evaluation will probably not be a part of this project.

12b. Evaluation data are being collected on a regular basis already.

85% Yes 10 No 3 No response

13. Aspects of the project to be evaluated. (Projects may be collecting data on more than one.)

89%	Student reactions to project
78	Student performance
52	Classroom and teaching processes
43	Faculty performance
80	Instructional materials
55	Courses or curriculum
72	Project activities as a whole
10	Others

14. Measures of student achievement which are part of project evaluation. (Projects may be collecting data on more than one.)

51%	Multiple-choice or essay examinations
17	Papers or essays
35	Experiment or laboratory reports
26	Grading of in-class performance
40	Overall course grades
15	Special project grades
29	Proficiency tests of special skills or special training
13	Presentations
6	None
17	Others

15. Other types of evaluation data. (Projects may be collecting more than one.)

71%	Faculty opinions or ratings of project activities or outcomes
82	Student opinions or ratings of project activities or outcomes
34	Observations of students in class
27	Observations of faculty teaching
80	Documentation of project activities
49	Interviews with project participants
26	Attrition reports
42	Enrollment records
0	None
12	Other

16. Participants in major decisions on project evaluation.

16%	The project director
6	A single person responsible for conducting the evaluation (other than the project director)
9	A small group of project staff (other than the above)
40	All or most of project staff
0	Non-CAUSE faculty members
0	Non-CAUSE administrative personnel
29	Other

17. The role of project evaluation.

	Strongly Agree	Agree	Disagree	Strongly Disagree	No Response
Evaluation plays a more prominent role in our CAUSE project than it does elsewhere in our institution's science programs	44%	42	15	0	0
The evaluation of our CAUSE project probably requires more time and effort than it is worth	6	19	62	13	0
It is important that CAUSE guidelines require evaluation as part of projects	33	60	6	2	0
Project staff have acquired additional expertise in evaluation as a result of the CAUSE project	24	49	20	2	5
If CAUSE guidelines had not required evaluation it would not have been included in this project	12	20	53	15	0
Our CAUSE project has helped science faculty members to integrate evaluation into ongoing science programs at our institution	10	33	45	7	6

	Strongly Agree	Agree	Disagree	Strongly Disagree	No Response
Formal evaluation activities take too much time and effort for our project	5%	16	62	17	1
Our CAUSE project has led to an increased concern for the quality of evaluation efforts in my department	8	40	44	3	5

18. *If there are any formal or informal evaluation activities on your project which have not appeared in the above items, please describe these activities below.*

% of Total	% of Respondents	
9	50	Formative evaluation involving faculty feedback
3	19	Students involved with evaluation effort
3	19	Use of outside consultants
1	6	Pre-test, post-test on student achievement
1	6	In future, evaluate alternative modes of A.V. presentation

19. *What has been the most important success your project has experienced?*

% of Total	% of Respondents	
28	29	Faculty awareness, improved attitudes, new skills
26	27	Curriculum development/expansion
20	21	New facilities/computer
17	17	Improvement in student attitudes/performance
11	12	New sense of community/purpose
8	8	Development of new instructional methods
3	3	Development of individualized instruction
2	2	Generation of evaluation scheme
2	2	Outreach to other institutions or departments or industries that are in the forefront of science and science teaching

20. *What has been the most significant disappointment or failure your project has experienced?*

% of Total	% of Respondents	
16	17	Failure to get maximum productivity from staff
15	16	Behind schedule
15	16	Lack of institutional support
9	10	Insufficient funding
8	9	No disappointments yet
8	9	Difficulty in gaining student support
7	7	Some project goals not met
6	6	Integration of innovation into curriculum
6	6	Equipment problems
2	3	Evaluation
2	3	Lack of skilled programming
2	3	Loss/change of staff

21. *Please list any particular aspects of the CAUSE program that you believe merit additional study.*

% of Total	% of Respondents	
9	18	Study successes/failures--do a "lessons learned" dissemination effort
7	13	Desirability to expand project to new populations/departments/fields
6	11	Do a study on effectiveness of one pedagogic innovation over another or over regular program
6	11	Find a way to do better evaluations
3	7	Look for better management strategies for project

Table 3

Survey of CAUSE Project Directors
Percentages of Response
Fall, 1979
N=95

1a. The three most important planned outcomes of the CAUSE project.

81%	Curriculum additions/revisions
59	Equipment and facilities acquisitions
54	Individualized instruction
45	Computer applications
28	Faculty development
25	Remediation

1b. *Which of the six CAUSE project outcomes best describes your project?*

% of Total	% of Respondents	
28	31	Curriculum additions and revisions
23	25	Equipment and facilities acquisition
17	18	Computer acquisition/application
16	17	Individualized instruction
7	8	Faculty development
4	4	Remediation

2. History of CAUSE activities.

10%	Some of the activities on our CAUSE project were begun under support from another externally-funded project.
44	Some of the activities on our CAUSE project were begun on funds from our institution's budget.
40	No activities for this project were begun before the preparation of the proposal.
6	More than one response.

Note: Percentages may not add up to 100% due to rounding error or because project directors were free to give more than one response. Questions which appear in italic type had open-ended responses which were then categorized. Percentages are shown for both the total number of survey respondents and the number of respondents to the question.

3. Institution submitted a proposal(s) to CAUSE before this one was funded.

38%	Yes, another version of the current project proposal was submitted.
5	Yes, a proposal for another project in the same discipline as our funded project was submitted.
17	Yes, a proposal for another project in a different discipline was submitted.
34	No, the proposal for our current project was the only one our institution has ever submitted to CAUSE.
12	No, not to my knowledge.

4a. Reviewers' comments requested and received on proposals that were *not* funded.

45%	Yes, the reviewers' comments were requested and received.
48	The reviewers' comments were requested but never received.
0	No, the comments were not requested.
6	No, not to my knowledge.

4b. *If the reviewers' comments were received, how were the comments used in preparing another CAUSE proposal?*

% of Total	% of Respondents	
24	33	Reviewers' comments used to rectify deficiencies in earlier proposal
23	32	This item is not applicable
12	16	Reviewers' comments used to change the emphasis of the proposal
10	13	Reviewers' criticisms were answered in proposals and/or unhelpful comments were ignored
5	7	Reviewers' comments were used to change the evaluation strategies
3	4	Reviewers' comments were used to increase institutional support of the proposal

5a. *Did you participate in the development of the proposal for your CAUSE project?*

97% Yes 3% No

5b. *If you answered "yes", how did you find out about the CAUSE program?*

% of Total	% of Respondents	
38	39	Office of research service, sponsored programs, grants management or grants officer
28	29	Visitors from NSF or NSF brochures, flyers
26	27	College administration
14	14	NSF briefing meeting
4	4	Prior experience with NSF
3	3	Faculty contacts
3	3	Faculty went out and looked for grant opportunities

6. Group(s) or individuals primarily responsible for the development of the proposal.

66%	Faculty group
28	One faculty member
15	Administrators
12	Other
1	Students

7a. Was more than one department or group of faculty interested in applying for a CAUSE grant?

48% Yes 53% No

7b. *If you answered "yes", how was it determined which department or groups would submit?*

% of Total	% of Respondents	
18	28	Cooperative combined effort
15	23	Criteria were established for determining the best proposal
14	21	Administrative decision
10	16	Not applicable or don't know
5	8	Submitting group was ready with a proposal first
5	8	Anyone interested could participate

8. *How were staff members selected to be involved in the CAUSE project?*

% of Total	% of Respondents	
33	33	Selected by subject area, expertise, teaching area, or position
28	29	Self-selected: anyone interested could participate
23	24	Selected by president, dean, department head or project director
16	16	Selected because of proven commitment and/or participation in proposal writing effort
3	3	Item not applicable
3	3	Those who thought the question referred to proposal writing activity

9. Project director's previous experience managing externally-funded projects in a higher education setting.

42%	Have managed at least one externally-funded instructional improvement project prior to CAUSE.
39	Have managed at least one externally-funded research project prior to CAUSE.
31	This CAUSE project is my first experience with project management.

10. Previous experience of project staff with instructional improvement projects.

1%	None of project staff has prior experience with instructional improvement projects similar to the CAUSE project.
42	Some of our project staff have prior experience with instructional improvement projects similar to the CAUSE project.
46	Most of our project staff have prior experience with instructional improvement projects similar to the CAUSE project.
11	More than one response.

11. *If you had been able to request additional outside assistance in planning your CAUSE project and preparing your CAUSE project proposal, what kind of assistance might have been helpful?*

% of Total	% of Respondents	
30	32	Didn't need any help
18	20	Needed help in organizing activities, staff time, budget
18	20	Needed to see successful proposals and/or CAUSE projects, project staffs
10	10	Needed outside consultants in areas not mentioned in other categories
8	9	Item not applicable
7	8	Needed help on evaluation
6	7	Needed help in understanding NSF policies/ guidelines
6	7	Needed help in proposal writing

12a. Accuracy of the original description in the proposal for each of the following project components.

	Very Accurate	Generally Accurate	Generally Inaccurate	Very Inaccurate	No Response
Project activities	55%	44%	1%	0%	0%
Project objectives and goals	58	41	1	0	0
Project management	43	54	2	0	1
Time tables or timelines	12	56	27	5	0
Budget	19	65	15	1	0
Evaluation plans	22	60	16	1	1
Impact of project	34	55	6	0	5

12b. *How has your project been modified during the operation to incorporate new findings and/or experience gained?*

% of Total	% of Respondents	
26	28	No changes or slight changes or changes as planned
19	20	Changes in implementation strategies, methods or activities
13	13	Changes in personnel or in staff roles
13	13	Changes in timelines
12	12	Modifications in equipment/facilities
12	12	Changes in software, materials
7	8	Changes in budget
7	8	Changes in computer equipment
5	6	Changes in goals or objectives
5	6	Changes in evaluation strategies or plan

13a. Importance of some activities to project success.

	Extremely Important	Important	Somewhat Unimportant	Totally Unimportant	Doesn't Apply or No Response
Project planning & management sessions	32%	51%	12%	2%	4%
Efforts to win support for our project at our institution	44	34	15	3	4
Working collaboratively with project staff	45	38	12	1	4
Working with students on the project	19	51	19	3	8

13a. (Continued)

	Extremely Important	Important	Somewhat Unimportant	Totally Unimportant	Doesn't Apply or No Response
Evaluating the project	26%	57%	14%	2%	1%
Designing instructional materials	58	31	4	1	6
Designing facilities & selecting equipment	50	34	7	1	8
Describing the project to others	17	53	25	3	2
Developing a new curriculum	20	38	21	3	18
Seeking financial support for the project once NSF funds are gone	20	40	21	7	12
Teaching (related to our project)	42	50	4	0	4
Working with lab technicians/ programmers, etc.	13	41	15	6	25
Working with non-project faculty	21	25	22	14	18

13b. *Are there other activities not identified above that are important to project success?*

% of Total	% of Respondents	
18	32	Communication/promotion of good relations with NSF, institution, students, dissemination
17	30	No other activities
11	19	Getting and keeping cooperation/participation of faculty and administration
5	9	Getting a good, committed staff
3	6	Use of outside consultants

14a. Have you described your project to someone from other institutions?

90% Yes 9% No 1% No response

14b. *If you did have the opportunity to describe your CAUSE project to someone at other institutions, what did you say was the most important outcome of your project?*

% of Total	% of Respondents	
24	27	Improved curriculum/upgraded program
19	21	Development of improved attitudes toward computers, computer-related materials
14	15	Improved equipment/facilities
14	15	Improved instructional options for students
12	13	Improved lab opportunities
10	11	Accommodations to student learning needs, especially non-science majors or slower learners
10	11	Improved student attitudes
8	9	Increased student learning
8	9	Improved faculty attitudes
5	6	No one most important outcome or not applicable or don't know
5	6	Upgraded or new faculty skills

15a. Seriousness of various difficulties which may arise on a CAUSE project.

	Critically Serious	Serious	Somewhat Serious	Not Serious At All	Doesn't Apply or No Response
Delay of formal approval of our project by NSF	0%	13%	25%	43%	19%
Confusion of responsibilities within our project	1	2	21	63	13
Insufficient attention given to project planning	1	1	14	62	22
Unclear decision-making policies on our project	0	2	12	67	19
Lack of necessary technical assistance	3	8	24	43	21
Short supply or delay of materials	5	8	27	46	13
Communication problems within our institution	7	6	25	51	10
Misunderstanding of project objectives by project personnel	1	4	16	66	13
Reluctance of important department or school administrators to commit themselves to project	6	10	22	53	9
Lack of attention given to problems of implementation by project staff	3	7	28	50	12
Conflicts among project personnel	3	10	71	17	0
Difficulties with our institution's rules and regulations	6	6	10	64	14
Difficulties with NSF's rules and regulations	0	0	7	80	13
Lack of sufficient time to complete planned activities	3	18	36	35	8

15a. (Continued)

	Critically Serious	Serious	Somewhat Serious	Not Serious At All	Doesn't Apply or No Response
Conflicting commitments on the part of project staff	3%	18%	36%	35%	8%
Budgetary problems	4	8	19	62	6
Securing matching funds	3	6	11	66	14

15b. *Are there other difficulties you have encountered in project implementation which we have not described above?*

% of Total	% of Respondents	
18	27	No other difficulties or not applicable
7	11	Lack of cooperation from faculty or some faculty
6	9	Changes in project staff
4	6	Delays in construction/renovation
4	6	Lack of cooperation from institution administration
4	6	Red tape in going through state, county, consortium channels

16. *What is the most serious difficulty your CAUSE project has encountered and how was it handled?*

% of Total	% of Respondents	
21	22	Delays; too little time; missed deadlines
13	13	Too little productivity, inter-personal conflicts, confusion over roles among project staff
13	13	Getting cooperation of affected faculty
12	12	Referred to an earlier question as containing the answer to this one

16. (Continued)

% of Total	% of Respondents	
8	9	Lack of cooperation by administration
8	9	Inadequate budget
6	7	Personnel changes
4	4	Acquisition of equipment/software/materials
4	4	None
3	3	Informing students of services

17. Areas of expertise that would have been helpful.

27%	Evaluation
23	Computer applications
15	Project management
13	Budget management
13	Instructional development
11	Other
8	Audiovisual media
8	Equipment ordering
8	Curriculum development
7	Science/social science content experts

18a. Are there incentives provided by your institution for working on CAUSE?

44% Yes 55% No 1% No Response

18b. *Are there incentives provided by your institution for working on the CAUSE project? If "yes", describe these incentives.*

% of Total	% of Respondents	
22	46	Release time for faculty working on project
16	33	Verbal encouragement; campus community recognition
7	15	Summer support/support for project-related activities

18b. (Continued)

% of Total	% of Respondents	
5	11	Stipend/merit raises
4	9	Don't know or not applicable
3	7	Counts toward promotion/tenure

18c. *Are there incentives provided by your institution for working on the CAUSE project? If "no", what incentives would have been helpful for achieving the project goals?*

% of Total	% of Respondents	
17	31	Release time
12	22	Administrative recognition/encouragement
11	20	Financial incentives
7	14	Don't need incentives
6	12	Promotion/tenure
6	12	Item not applicable
4	8	Institutional help in bringing about smooth implementation
3	6	Additional staff

19a. *How much faculty release time or replacement time has been covered full or part time by CAUSE monies?*

% of Total	% of Respondents	
64	64	Release time in academic year
24	24	No release time
15	15	Summer stipends

20a. *In your opinion how have faculty members at your institution changed as a result of the CAUSE project? Please describe briefly as to: What do you expect the change to be?*

% of Total	% of Respondents	
23	27	Faculty will learn how to develop curriculum, individualize instruction, develop materials
23	27	Faculty will develop more expertise and positive attitudes toward using/teaching computer
19	22	Faculty will improve teaching and interact with students more effectively
13	15	Faculty will learn content areas outside their own area of expertise
12	13	Faculty will engage in new experience (research, planning, proposal writing, teaching off campus) and will have an enhanced sense of professionalism
7	9	Faculty will cooperate better interdepartmentally
6	7	Faculty will benefit from improved facilities/ equipment

20b. *In your opinion, how have faculty members at your institution changed as a result of the CAUSE project? Please describe briefly as to: What impact has already been felt?*

% of Total	% of Respondents	
21	22	Faculty capabilities have been broadened and increased and faculty are engaging in new activities
20	21	Teaching effectiveness has been enhanced and faculty have a better relationship with students
16	17	Faculty have undertaken curriculum development projects
16	17	Faculty have increased use of computer and computer-related materials and/or improved attitudes toward computing
14	14	Faculty in target departments have responded/ shown interest
6	7	Faculty morale is improved
5	6	Faculty are benefiting from improved equipment/facilities

21a. *In your opinion, how have the science curriculum and/or some courses at your institution changed as a result of the CAUSE project? Please describe briefly as to: What do you expect the change to be?*

% of Total	% of Respondents	
27	28	Addition of special components/features to specific existing courses
17	17	Modifications or innovation in existing courses
16	16	Better options/services, opportunities for students
12	12	Development of new courses or kinds of courses
7	7	Improved instruction/faculty attitudes
6	6	Proposed activities are being implemented
5	5	Upgraded equipment/facilities implies improved curriculum
4	4	Higher student enrollment/interest
4	4	New/revised materials

21b. *In your opinion, how have the science curriculum and/or some courses at your institution changed as a result of the CAUSE project? Please describe briefly as to: What impact has already been felt?*

% of Total	% of Respondents	
19	22	Better options, services, opportunities for students
18	21	Addition of new components/features to existing courses
14	16	Development of new courses/sequences or kinds of courses
8	10	Proposed activities are being implemented
8	10	Too early or no observed impact or NA (no answer) or expectations not met .
8	10	Higher student enrollment/interest

21b. (Continued)

% of Total	% of Respondents	
6	7	Improved instruction/faculty attitudes
5	6	Modifications or innovation in existing courses
5	6	New activities for faculty
5	6	New/revised materials
4	5	Upgraded equipment/facilities implies improved curriculum

22a. *In your opinion, how have science equipment and/or facilities at your institution changed as a result of the CAUSE project and have the changes had the effects you anticipated? Please explain as to: What do you expect the change to be?*

% of Total	% of Respondents	
22	26	New equipment, materials/facilities
20	23	Enable, bring about, instructional improvement
16	18	Upgrade, expand, improve equipment/facilities
13	15	Obtain new computer equipment
10	11	No impact/not applicable
8	10	Upgrade, expand, improve computer equipment
2	2	Improved faculty and/or student morale
2	2	Positive impact outside CAUSE project

22b. *In your opinion how have science equipment and/or facilities at your institution changed as a result of the CAUSE project? Please describe briefly as to: What impact has already been felt?*

% of Total	% of Respondents	
23	26	Enable, bring about improved instruction
14	16	New equipment, materials, facilities
11	12	No impact/not applicable
10	11	New computer hardware/software
10	11	Upgrade, expand, improve equipment/facilities
8	10	Proposed activities have been implemented
7	8	Positive impact outside CAUSE project
6	7	Improved faculty and/or student morale
5	6	Upgrade, expand, improve computer equipment

23a. *In your opinion how have students at your institution changed as a result of the CAUSE project? Please explain as to: What do you expect the change to be?*

% of Total	% of Respondents	
50	55	Improved training, student competency
20	22	Improved student attitudes toward target courses and the related disciplines
11	12	Higher student enrollments
10	11	Students are more proactive, participate more
3	4	Too early to tell or not applicable or don't know

23b. *In your opinion how have students at your institution changed as a result of the CAUSE project? Please explain as to: What impact has already been felt?*

% of Total	% of Respondents	
30	32	Improved training, student competency
21	23	Students are more proactive, participate more
16	17	NA or too early to tell or don't know or less impact than expected
14	15	Improved student attitudes toward target courses
10	10	Implementation of activities is proceeding/ students are changing or have changed
8	9	Higher student enrollments

24. *Have any unexpected changes occurred as a result of the CAUSE project? Please describe them.*

% of Total	% of Respondents	
20	24	None
16	19	Unexpected outcomes; spin-offs from CAUSE
11	13	Higher faculty use/acceptance than expected
8	10	Higher student use/acceptance than expected
7	9	General impact and/or impact on the community greater than expected
6	8	Faculty more involved in new activities than expected
4	5	More negative impacts than expected
3	4	Better faculty morale and collaboration than expected

25. *If you had the chance to start your CAUSE project over again, from the beginning, what would you do differently?*

% of Total	% of Respondents	
22	23	Better front-end planning
17	17	No changes
16	16	More release time and/or summer support for faculty and project staff
15	15	Increase budget
14	14	Make changes in staffing
12	12	Changes in strategies, activities, equipment
10	10	More faculty participation/cooperation
6	7	Better management
4	4	Change evaluation plan

26a. Have you sought or will you seek funding to continue CAUSE activities?

70% Yes 21% No 10% No response

26b. *Have you sought or will you seek funding from other sources to continue activities started under CAUSE? If "yes", from what sources will you seek funding?*

% of Total	% of Respondents	
30	39	NSF
28	38	Private foundations, individuals, corporations
20	26	Own institution
16	21	Don't know
12	15	Federal agencies other than NSF
4	6	State agencies

26c. *Have you sought or will you seek funding from other sources to continue activities started under CAUSE? If "no" will activities started as a part of the CAUSE project continue after CAUSE funding has ended?*

% of Total	% of Respondents	
38	100	Yes - can operate within college/university/ consortium budget

27. Evaluation can best be described as the following:

	Strongly Agree	Agree	Disagree	Strongly Disagree	No Response
Evaluation is important to the institution in monitoring the effectiveness of projects of this type	39%	54%	5%	1%	1%
The best way to evaluate a CAUSE project is to have an expert(s) from outside our institution review our project outcomes	12	31	53	3	2
The primary reason evaluation is included in our project is mostly to meet CAUSE requirements for evaluation	7	28	48	15	1
A clear and thorough description of our project will meet CAUSE requirements for project evaluation	4	43	36	13	4
Evaluation results have been used to change some of the activities and/or outcomes of this project	20	48	20	2	10
Our project funds allocated for evaluation activities could be better spent on other project activities	5	22	53	14	6
Formal evaluation activities take up too much time, effort, and money on our CAUSE project	6	21	56	13	4

27. (Continued)

	Strongly Agree	Agree	Disagree	Strongly Disagree	No Response
Negative evaluation results on our CAUSE project might jeopardize our institution's chance at further external funding for science instruction	2	16	57	12	14
Project evaluation means conducting activities which have little or no usefulness to our CAUSE project staff	0	12	67	20	1
Project evaluation is best accomplished and most highly useful when it is conducted internally by project personnel in an ongoing manner	18	54	22	2	4
The best way to conduct evaluation of our CAUSE project is to try to measure student achievement gains	6	37	44	4	8
Given the nature of our project, evaluation is really an irrelevant activity	0	8	55	34	3
Evaluation activities have not gone as planned	5	34	53	7	1
To do the kind of evaluation we would like, we need more money and staff	10	27	54	7	2
We are not qualified to do an internal evaluation of our project	1	12	63	22	2

28. *If you had the opportunity to suggest strategies for promoting project success to a prospective CAUSE project director, what would be your recommendation?*

% of Total	% of Respondents	
24	26	Make sure that management and authority issues are carefully worked out
21	23	Do careful front-end planning
18	20	Get the participation/commitment of the faculty
14	15	Get the cooperation/commitment of the administration
14	15	Implement carefully with attention to detail
11	12	Select staff carefully
7	8	Get release time for faculty and for staff development
6	7	Make sure communication is frequent and adequate
5	6	Be willing to dedicate yourself
3	3	Use evaluation formatively

29. *If you had the opportunity to advise a prospective CAUSE project director about CAUSE project evaluation, what would be your primary recommendation?*

% of Total	% of Respondents	
22	24	Use outside experts
20	22	Know what you want; be realistic; be satisfied with plan
13	14	Do formative evaluation
13	14	Use internal people for evaluation
11	11	Do objectives-based evaluation
6	7	Start early
3	3	Avoid traditional evaluation techniques

30. *If you had the opportunity to make one suggestion to the NSF-CAUSE program office to improve the CAUSE program, what recommendation would you make?*

% of Total	% of Respondents	
40	43	More/better communication, dissemination among projects and with NSF staff
21	23	None - doing a good job
7	8	More flexibility for project directors; less red tape
5	6	More funding/follow-up/changes
5	6	Better evaluation policy
4	5	Make changes in policies around awards
4	5	Institutional commitment should be assured
3	3	Reviewers should be in fields of subject of proposal or from same kind of institution
3	3	Institutions shouldn't be required to change/ modify to please NSF

CONTENT ANALYSIS OF FUNDED PROPOSALS, 1976-1979

Purpose of the Content Analysis

A content analysis of funded proposals was chosen as a broad focus evaluation activity because of its advantage in supplying data from available documents. As a result, there was no need to gather some kinds of information from individual sites. It also offers the opportunity to study the tenor of CAUSE projects prior to their implementation. These data can then be viewed in relationship to the other data collection activities, the surveys, site visits, and case studies.

The content analysis provides information relevant to certain aspects of the evaluation issues of concern. For example, proposals contain specification of institutional needs, institutional goals and objectives, and methodology of project implementation. Through the analysis of proposals, these areas were categorized and compared across such variables as project year and type of institution. Another function of the content analysis was to look at trends in science education as described by proposing institutions. Therefore, the primary purpose of the content analysis of funded proposals was to provide baseline data to support and drive other evaluation activities.

CAUSE proposals provide a valuable source of information about perceived needs and goals and the planned strategies for meeting the needs and achieving the goals. They are statements of what could be, and further what ought to be, in the eyes of proposers.

Content Analysis for this Evaluation

Category selection. The evaluation team at DEA made changes in categories earlier created by NSF's Office of Program Integration in order to make the content analysis data more useful in the scheme of the total evaluation. New categories and sub-categories were added while others were expanded to add detail or were collapsed for clarity. The development of a final set of categories has been the result of a long and careful team effort to produce categories that are not too ambiguous or overlapping, and which arise most naturally from data in the proposals. The major variables used in the content analysis are:

1. Institutional type
2. Discipline
3. Audience
4. Problems and needs
5. Goals and objectives
6. Outcomes

Each of these has been divided into categories and subcategories. All the categories and subcategories were chosen with the intent of maximizing inter-reader reliability in data collection.

Institution type and discipline. The first two variables, "institution type" and "discipline" are self-explanatory: institution types are exactly the same as those described by NSF -- two-year, four-year, Ph.D granting and consortium. Discipline includes the major disciplinary areas defined by NSF for use by the proposers.

Audience. The "audience" variable contains six categories which differ somewhat from those identified by NSF. This variable defines that group (or groups) for which the proposed project is meant. The six categories under audience are:

1. Faculty
2. Local community
3. Majors and Non-Majors: Introductory
4. Science Majors: Introductory
5. Science Majors: Advanced
6. Non-Science Majors

Problems and needs. NSF divided "problems" and "needs" into two categories where "needs" described the kind of intervention that has been identified as most likely to solve institutional problems and where "problems" meant an identifiable lack, an area requiring action. In our classification system, "problems and needs" have been collapsed into one variable which has the same focus as the "problems" section for NSF; that is, an identifiable lack. The categories under "problems and needs" which we identified are:

1. Curricula need revision/addition to keep pace with current state of science education.
2. Teaching methods are not as effective or efficient as they should be.
3. Faculty need to update knowledge or skills.
4. Missing/inadequate hardware, software, facilities.
5. Student problems necessitating curricular or instructional revisions.

It will be noted that this classification system is very similar to "problems" categories except that the student problems category is broader, allowing for greater inclusiveness, and there is the addition of the "missing/inadequate hardware, software, and facilities", a category that is covered in NSF's "needs" section.

Goals and objectives. The next major variable devised by DEA is called "goals and objectives". It is roughly equivalent to NSF's "needs" in that it identifies the desired approach to solving the problem or

satisfying the need. It identifies, in other words, the purpose of the innovation. The categories are:

1. To accommodate students at their levels and for their needs.
2. To update curricula to keep pace with the current state of science education.
3. To improve teaching methods to make them more efficient or effective.
4. To provide for faculty development.

It will be noted that where NSF identified seven major desired approaches to solving problems, we have identified only four. We originally left out NSF's four categories which were related to equipment, materials, and laboratories and included them in our "problems and needs" section. However, as we analyzed the 1976-1978 group of proposals, we ended up writing goals and objectives related to equipment/facilities use and acquisition in the "other" column. As a result, when revising the content analysis categories for the 1979-analysis, we added a fifth category to "goals and objectives": equipment and facilities acquisition. Data in the tables reflect this addition.

Outcomes. Our final major variable is "outcomes". By "outcome" we mean the strategy or strategies chosen by an institution to meet its goals and objectives. To put it another way, the variable identifies, specifically, what the grant will be used to do. The categories are:

1. Faculty development
2. Remediation/individualized instruction
3. Curriculum addition/revision
4. Use of computers
5. Equipment/materials/facilities

These categories are roughly equivalent to those of NSF's "strategies".

During the first stage of the content analysis, we collected and analyzed data from funded proposals from funding years 1976-1978. Subsequently, we analyzed 1979 proposals. Using what we had learned during the first analysis, we eliminated a few empty categories and added "equipment and facilities acquisition" to our "goals and objectives" category. In developing the original set of categories, it was assumed that equipment acquisition would not stand alone as a goal. However, in reviewing the first round of proposals, we often found institutions siting acquisition as a goal. It was also determined that equipment acquisition often consumed a significant portion of the budget. Hence, the category was added for the 1979 review. Other smaller subcategories were added to the components of the outcomes. All cross-tabluations were then recomputed and include all funded proposals from the four years, 1976-1979.

The general project variables. Table 4 depicts major categories and sub-categories of problems and needs reflected in the 273 funded proposals. The most frequently cited categories were:

> Hardware and software are missing and/or laboratory or learning center facilities are inadequate (51%);
>
> Existance of student problems which necessitate curricular or instructional revisions (41%);
>
> The curriculum is in need of additions or revisions (40%).

Again, we assumed that projects might reflect more than one problem or need. Therefore, tabled figures reflect a duplicated count.

Table 5 presents the goals and objectives of the funded CAUSE projects. As previously explained, DEA did not originally create a category for equipment/facilities development in the goals and objectives section, but added that category in the 1979 analysis. Therefore, the "other" category (45%) includes equipment and/or facilities from the 1976-1978 proposals. The shift in this area will be more clearly seen when the data are analyzed over project initiation years. Of the remaining

categories, two were most often cited:

> To update curricula in order to keep pace with the current state of science education (46%)
>
> To improve teaching methods in order to make them more efficient and effective (39%)

As before, we allowed a maximum of three categories of goals and objectives to be cited by each individual project. Therefore, figures reflect a duplicated count.

The major outcomes and primary outcome of all funded CAUSE projects are shown in Tables 10 and 11. In the first table, figures reflect counts of a maximum of three major outcomes while the second shows a primary outcome for each of the 273 funded projects. The three most frequently cited major outcomes were:

> Equipment, materials, and/or facilities (61%)
>
> Computer acquisition and/or applications (51%)
>
> Curriculum additions or revisions (49%)

However, the figures change somewhat when only primary outcomes are analyzed: the most frequently cited categories remain the same and occur in relatively similar proportions, but faculty development projects fall from 23% to 3%. This factor indicates the secondary nature of faculty development among the CAUSE projects.

In reviewing the consistency of response among this last group of tables, some interesting patterns emerge. For example, need for faculty skill and knowledge development was reflected in 40 of the proposals, while 61 institutions cite faculty development as a goal, and 63 mention it as an outcome. This seems to indicate that while faculty development is not regarded as a need or problem, it is often thought of as a solution to more general problems (most often student needs). It may also be the case that faculty development would occur as a result of changes in

teaching methods or equipment/facilities acquisition or adaptation. More projects cited curriculum additions or revisions as an outcome (n=134) than as a need (n=109). Again, this indicates the utilization of curricular change to solve other types of problems. In tabulating responses, we also found many institutions citing student problems but suggesting computer acquisition or equipment and materials acquisition as objectives and outcomes. This again reflects the pattern of using a variety of means to solve student problems.

Table 4

Problems and Science Education Needs
Frequencies and Percentages

Problem or Need[a]	All Funded Proposals f	All Funded Proposals %
Curriculum needs revision or additions due to:	109	40
Inadequate coverage	75	27
Changing goals	20	7
Other reasons	17	6
Teaching methods are not as efficient or effective as they should be	59	22
Faculty need to update knowledge or skills in the following areas:	40	15
Instructional techniques	9	3
Subject matter	6	2
Computer skills	28	10
Hardware and software are missing and/or facilities are inadequate	140	51
Student problems which necessitate curricular or instructional revisions due to:	111	41
Inadequate preparation of incoming students	53	19
Poorly motivated students	7	3
Poor success rate of students	25	9
Increasing diversity of the student population	54	20
Other problems or needs	10	3
Total	273	100%

[a]Proposals may address more than one problem or need. Therefore, frequencies and percentages reflect a duplicated count. In the content analysis, the number of problems or needs which a proposal could be listed as addressing was limited to three. This did not eliminate a significant number of problems because very few proposals discussed more than three.

Table 5

Goals and Objectives of CAUSE Projects

Frequencies and Percentages

Goals and Objectives[a]	All Funded Proposals f	%
To accommodate students at their levels and/or for their needs	61	22
To update curricula in order to keep pace with the current state of science education	125	46
To improve teaching methods in order to make them more efficient and effective	107	39
To provide for faculty development	61	22
Equipment and facilities acquisition (data on '79 only, n=72)	52	72
Other (includes equipment and facilities from 1976-1978)	123	45
Total	273	100%

[a]Proposals may address more than one goal or objective. Therefore, frequencies and percentages reflect a duplicated count. In the content analysis, the number of goals and objectives which a proposal could be listed as addressing was limited to three. This did not eliminate a significant number of goals and objectives because very few proposals discussed more than three.

Table 6

Outcomes of CAUSE Projects

Frequencies and Percentages

Outcome[a]	All Funded Proposals f	%
Faculty Development	63	23
Individualized Instruction/Remediation	62	22
Curriculum Addition/Revision	134	49
Computer Acquisition/Applications	138	51
Equipment/Materials/Facilities	167	61
Total	273	100%

[a]Proposals often describe more than one outcome. Therefore, frequencies and percents reflect a duplicated count. In the content analysis, the number of outcomes which a proposal could be listed as addressing was limited to three. This did not eliminate a significant number of outcomes because very few proposals described more than three.

Table 7

Primary Outcome of Each CAUSE Project

Frequencies and Percentages

Primary Outcome[a]	All Funded Proposals f	%
Faculty Development	8	3
Individualized Instruction/Remediation	43	16
Curriculum Addition/Revision	77	28
Computer Acquisition/Application	67	24
Equipment/Materials/Facilities	75	27
Total	273	100%

[a]One primary outcome was listed for each project.